APPENDIX E

Section III from "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their uses" (Stephan et al. 1985)

MINIMUM DATA REQUIREMENTS FROM GUIDELINES FOR DERIVING NUMERICAL NATIONAL WATER QUALITY CRITERIA FOR THE PROTECTION OF AQUATIC ORGANISMS AND THEIR USES

Required Data

A. Certain data should be available to help ensure that each of the four major kinds of possible adverse effects receives adequate consideration. Results of acute and chronic toxicity tests with representative species of aquatic animals are necessary so that data available for tested species can be considered a useful indication of the sensitivities of appropriate untested species. Fewer data concerning toxicity to aquatic plants are required because procedures for conducting tests with plants and interpreting the results of such tests are not as well developed. Data concerning bioaccumulation by aquatic organism are only required if relevant data are available concerning the significance of residues in aquatic organisms.

B. To derive a criterion for freshwater aquatic organisms and their uses, the following should be available:
    1. Results of acceptable acute tests (see Section IV in Stephan et al. 1985) with at least one species of freshwater animal in at least eight different families such that all of the following are included:
        a. The family Salmonidae in the class Osteichthyes.
        b. One other family (preferable a commercially or recreationally important warmwater species) in the class Osteichthyes (e.g., bluegill, channel catfish, etc.).
        c. A third family in the phylum Chordata (e.g., fish, amphibian, etc.).
        d. A planktonic crustacean (e.g., cladoceran, copepod, etc.).
        e. A benthic crustacean (e.g., ostracod, isopod, amphipod, crayfish, etc.).
        f. An insect (e.g., mayfly, dragonfly, damselfly, stonefly, caddisfly, mosquito, midge, etc.).
        g. A family in a phylum other than Arthropoda or Chordata (e.g., Rotifera, Annelida, Mollusca, etc.).
        h. A family in any order of insect or any phylum not already represented.

    2. ACRs (see Section VI) with species of aquatic animals in at least three different families provided that of the three species:
        --at least one is a fish.
        --at least one is an invertebrate.
        --at least one is an acutely sensitive freshwater species (the other two may be saltwater species).
    3. Results of at least one acceptable test with a freshwater alga or vascular plant (see Section VIII). If plants are among the aquatic organisms that

are most sensitive to the material, results of a test with a plant in another phylum (division) should also be available.

4. At least one acceptable bioconcentration factor determined with an appropriate freshwater species, if a maximum permissible tissue concentration is available (see Section IX).

C. To derive a criterion for saltwater aquatic organisms and their uses, the following should be available:

1. Results of acceptable acute tests (see Section IV) with at least one species of saltwater animal in at least eight different families such that all of the following are included:
   a. Two families in the phylum Chordata.
   b. A family in a phylum other than Arthropoda or Chordata.
   c. Either the Mysidae or Penaeidae family.
   d. Three other families not in the phylum Chordata (may include Mysidae or Penaeidae, whichever was not used above).
   e. Any other family.
2. Acute-chronic ratios (see Section VI) with species of aquatic animals in at least three different families provided that of the three species:
   --at least one is a fish.
   --at least one is an invertebrate.
   --at least one is an acutely sensitive saltwater species (the other two may be freshwater species).
3. Results of at least one acceptable test with saltwater alga or vascular plant (see Section VIII). If plants are among the aquatic organisms most sensitive to the material, results of a test with a plant in another phylum (division) should also be available.
4. At least one acceptable bioconcentration factor determined with an appropriate saltwater species, if a maximum permissible tissue concentration is available (see Section IX).

D. If all the required data are available, a numerical criterion can usually be derived, except in special cases. For example, derivation of a criterion might not be possible if the available ACR vary by more than a factor of ten with no apparent pattern. Also, if a criterion is to be related to a water quality characteristic (see Sections V and VII), more data will be necessary. Similarly, if all required data are not available, a numerical criterion should not be derived except in special cases. For example, even if not enough acute and chronic data are available, it might be possible to derive a criterion if the available data clearly indicate that the Final Residue Value should be much lower than either the FCV or the Final Plant Value.

E. Confidence in a criterion usually increases as the amount of available pertinent data increases. Thus, additional data are usually desirable.